REMARKS

This Response is submitted in reply to the non-final Office Action mailed on July 20, 2010. No fee is due in connection with this Response. The Director is authorized to charge any fees which may be required, or to credit any overpayment to Deposit Account No. 02-1818. If such a withdrawal is made, please indicate the Attorney Docket No. 3712174-00424 on the account statement.

Claims 6-7, 9-10, 12-14, 16-17 and 19-20 and 22-23 are pending in this application. Claims 1-5, 8, 11, 15, 18 and 21 were previously canceled without prejudice or disclaimer. In the Office Action, Claims 6-7, 9-10, 12-14, 16-17 and 19-20 and 22-23 are rejected under 35 U.S.C. §103. For at least the reasons set forth below, Applicants respectfully submit that the rejections should be withdrawn.

In the Office Action, Claims 6-7, 9, 12-13, 16-17, 19-20 and 22-23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Japanese Patent Publication No. 2002-075368 to Yamaura ("*Yamaura*") in view of U.S. Patent No. 6,258,483 B1 to Abe ("*Abe*") and International Patent Publication No. WO 00/02280 to Kurose et al. ("*Kurose*") and as evidenced by U.S. Patent Publication No. 2002/0192137 A1 to Chaloner-Gill et al. ("*Chaloner-Gill*"). For at least the reasons set forth below, Applicants respectfully submit that, even if combinable, the cited references fail to disclose or render obvious each and every element of independent Claims 6, 12, 16, 19 and 22-23 and Claims 7, 13, 17 and 20 that depend therefrom. Furthermore, one of ordinary skill in the art would have no reason to combine the cited references to arrive at the present claims.

Independent Claims 6, 12, 16, 19 and 22-23 recite, in part, a positive active material including one or more particles of lithium nickelate having a surface and having a formula $Li_yNi_{1-z}M'_zO_2$ where $0.05 \leq y \leq 1.2$ and $0 \leq z \leq 0.5$, and M' is selected from the group consisting of Fe, Co, Mn, Cu, Zn, Al, Sn, B, Ga, Cr, V, Ti, Mg, Ca, Sr and mixtures thereof; and an olivine compound having an olivine-type crystal structure and having a formula Li_xMPO_4 where $0.05 \leq x \leq 1.2$, and M is selected from a group consisting of Fe, Mn, Co, Ni, Cu, Zn, Mg and mixtures thereof, wherein: the surface of the particles of lithium nickelate are uniformly covered with the olivine compound such that the olivine compound forms a layer having a thickness of about 0.1 μm to about 10 μm around the lithium nickelate particles, a content of the olivine compound in the positive active material ranges from about 5 wt% to about 50 wt%, the particles of lithium nickelate having a diameter of about 10 to about 20 μm, and the particle size of the olivine

compound disposed on the lithium nickelate particle is one-half or less of the particle size of the lithium nickelate particle on which the olivine compound is disposed. By providing the claimed amount of olivine compound so as to uniformly cover the surface of the lithium nickelate particles and form a layer having the claimed thickness surrounding the lithium nickelate particles, rather than simply mixing the components such that the olivine compound adheres at random to the lithium nickelate particle surfaces, an improved charge/discharge capacity and high-temperature stability can be obtained. See, Specification, page 2, paragraph 19; page 3, paragraph 42; page 4, paragraphs 45-46 and 53-54. In contrast, the cited references are deficient with respect to the present claims.

For example, even if combinable, *Yamaura*, *Abe* and *Kurose* fail to disclose or suggest a positive active material wherein the surface of the particles of lithium nickelate are uniformly covered with the olivine compound such that the olivine compound forms a layer having a thickness of about 0.1 μm to about 10 μm around the lithium nickelate particles as recited, in part, by independent Claims 6, 12, 16, 19 and 22-23. The Patent Office asserts that *Yamaura* teaches coating $LiNi_{1-x}M_xO_2$ particles with $LiFePO_4$ particles by mixing and adjusting the rotational speed to produce the desired product. See, Office Action, page 3, lines 7-9. The Patent Office further asserts that this method is the same as the method disclosed in the present Specification and, thus, the resulting product would be the same. However, *Yamaura* merely discloses mixing $0.20LiNi_{0.8}Co_2$ particles with $LiFePO_4$ particles for 5 minutes at a rotational speed such that the processing temperature is between 35° C and 45° C. See, *Yamaura*, paragraphs 42-43. In contrast, the present Specification discloses mixing its particles under the following conditions: (1) in a disk mill at a rotational speed of 10,000 rpm for 10 minutes; or (2) in a high speed agitator at 80 m/s for 30 minutes. See, Specification, page 7, paragraph 93; page 9, paragraph 118. Nowhere does *Yamaura* teach or suggest that its processing conditions include the same rotational speed for the same amount of time or otherwise result in forming a layer of $LiFePO_4$ having the claimed thickness which uniformly covers its particles. Therefore, contrary to the Patent Office's assertions, the method of *Yamaura* is not the same as the method disclosed in the present Specification and does not necessarily result in the same product.

In fact, *Yamaura* teaches that its process results in $LiFePO_4$ particles merely adhered to the front face of $LiNi_{1x}M_xO_2$ particles. See, *Yamaura*, paragraphs 8 and 40. The present Specification expressly teaches that a positive active material in which the olivine compound is adhered at random on the surfaces of lithium nickelate particles does not achieve the same

improved charge/discharge capacity and high-temperature stability as the claimed material. See, Specification, page 3, paragraph 42. The Patent Office relies on *Abe* merely for the disclosure of varying the weight ratio of $LiFePO_4$ to lithium nickelate. See, Office Action, page 3, lines 19-22; page 4, lines 1-5. The Patent Office relies on *Kurose* merely as support for the claimed lithium nickelate compound. See, Office Action, page 5, lines 3-14. Nowhere do *Abe* or *Kurose* teach or suggest a positive active material including a layer of $LiFePO_4$ having the claimed thickness which uniformly covers lithium nickelate particles. Therefore, even if combinable, the cited references fail to disclose or suggest a positive active material wherein the surface of the particles of lithium nickelate are uniformly covered with the olivine compound such that the olivine compound forms a layer having a thickness of about 0.1 μm to about 10 μm around the lithium nickelate particles in accordance with the present claims.

Moreover, the claimed positive active material would not have been obvious to one of ordinary skill in the art because the Specification demonstrates unexpected results when the claimed positive active material is used. For example, Figure 5 demonstrates that the discharge capacity of a battery including the claimed positive active material does not significantly decrease even after a significant number of cycles. See, Specification, page 7, paragraphs 91-95; page 8, paragraphs 114-116; Fig. 5. In contrast, when lithium nickelate particles are merely mixed in a mortar for 30 minutes to form the positive active material, thereby randomly adhering the particles to the surface of the lithium nickelate as taught by *Yamaura*, the discharge capacity decreases significantly as the number of cycles increases. See, Specification, page 8, paragraph 106; Fig. 5. Thus, the use of a positive active material wherein the surface of the particles of lithium nickelate are uniformly covered with the olivine compound such that the olivine compound forms a layer having a thickness of about 0.1 μm to about 10 μm around the lithium nickelate particles achieves unexpected results over prior art positive active materials.

Furthermore, even if combinable, *Yamaura*, *Abe* and *Kurose* fail to disclose or suggest a positive active material wherein a content of the olivine compound in the positive active material ranges from about 5 wt% to about 50 wt% as required, in part, by independent Claims 6, 12, 16, 19 and 22-23. The Patent Office admits that *Yamaura* fails to teach the claimed weight percent of $LiFePO_4$ to lithium nickelate but nevertheless asserts that it would have been obvious to vary the ratio of materials because *Abe* teaches generally varying the amount of coating on its active material particles to generate desired properties. See, Office Action, page 3, lines 19-22; page 4, lines 1-5. However, contrary to the Patent Office's assertion, *Abe* fails to teach varying the

amount of olivine compound coated on another positive active material. Instead, *Abe* is entirely directed to coating nickel hydroxide powders with cobalt hydroxide powders and merely teaches that the amount of cobalt hydroxide can be adjusted to obtain a desired capacity. See, *Abe*, column 13, lines 38-56. As such, even if combinable, the cited references fail to disclose or suggest the claimed content of olivine compound in the positive active material.

One of ordinary skill in the art would also have no reason to combine the teachings of *Abe* with the positive active material of *Yamaura* to optimize the amount of olivine compound coated on the particles because *Abe* and *Yamaura* fail to teach that the amount of olivine compound coating has any particular effect on the stability or cycle characteristics of the battery. "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." See, M.P.E.P. § 2144.05(B) (2009).

Contrary to the Patent Office's assertions, *Abe* does not suggest that an amount of olivine compound coated on another positive active material has any effect on the performance of a battery, or that the amount of coating generally used on a positive active material has any effect on the stability or cycle characteristics of a battery. Instead, *Abe* merely teaches that the amount of cobalt hydroxide coated on nickel hydroxide particles can be adjusted to obtain a desired capacity. See, *Abe*, column 13, lines 38-56. Similarly, *Yamaura* is concerned only with the mixing temperature of its positive active material and fails to teach that the weight percent of $LiFePO_4$ in the positive active material has any effect on the performance of the battery. See, *Yamaura*, paragraphs 42-43. In fact, *Yamaura* teaches that the appropriate amount of coating for achieving improved battery performance is 3.2 wt%. See, *Yamaura*, paragraph 54. As such, one of ordinary skill in the art would have no reason to vary the amount of olivine compound coated on the particles of *Yamaura* to arrive at the present claimed range.

Accordingly, Applicants respectfully request that the rejection of Claims 6-7, 9, 12-13, 16-17, 19-20 and 22-23 under 35 U.S.C. §103(a) to *Yamaura*, *Abe* and *Kurose* be withdrawn.

In the Office Action, Claims 10 and 14 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Yamaura* in view of *Kurose*, and further in view of U.S. Patent No. 6,391,493 to Goodenough et al. ("*Goodenough*"). For at least the reasons set forth below, Applicants respectfully submit that, even if combinable, the cited references are deficient with respect to Claims 10 and 14.

As discussed previously, *Yamaura* and *Kurose* fail to disclose or render obvious a positive active material wherein: (1) the surface of the particles of lithium nickelate are uniformly covered with the olivine compound such that the olivine compound forms a layer having a thickness of about 0.1 μm to about 10 μm around the lithium nickelate particles; and (2) a content of the olivine compound in the positive active material ranges from about 5 wt% to about 50 wt% as required, in part, by independent Claims 6 and 12 from which Claims 10 and 14 depend. The Patent Office relies on *Goodenough* merely for the disclosure of $LiMnPO_4$ as a preferred olivine compound. See, Office Action, page 5, lines 19-22; page 6, lines 1-7. Nowhere does *Goodenough* teach or suggest using the claimed amount of olivine compound or forming the claimed coating of olivine compound on lithium nickelate particles, nor does the Patent Office cite support for such claimed combination. Thus, Applicants respectfully submit that, even if combinable, *Goodenough* fails to remedy the deficiencies of *Yamaura* and *Kurose* with respect to Claims 10 and 14.

Accordingly, Applicants respectfully request that the rejection of Claims 10 and 14 under 35 U.S.C. §103(a) to *Yamaura*, *Kurose*, and *Goodenough* be withdrawn.

For the foregoing reasons, Applicants respectfully submit that the present application is in condition for allowance and earnestly solicit reconsideration of same.

Respectfully submitted,

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